First record of the rare deep-water gobiid *Thorogobius rofeni* (Gobiidae) from the Southeast Atlantic

by

Michael SAUBERER & Harald AHNELT (1)

RÉSUMÉ. - Premier signalement de *Thorogobius rofeni* (Gobiidae) en Atlantique sud-est.

Six spécimens de *Thorogobius rofeni*, une espèce rare d'eau profonde, ont été capturés au large de l'Angola, Atlantique sud-est. Jusqu'à présent, un seul spécimen de cette espèce a été capturé dans le golfe de Guinée, Atlantique est-central.

Key words. - Gobiidae - *Thorogobius rofeni* - ASE - Southeast Atlantic - Angola - New record.

The majority of marine gobioid fishes occur inshore and inhabit littoral waters. Only a few species are reported as secondary deep-water forms (Andriyashev, 1953; Miller, 1988; Ahnelt *et al.*, 2000). Hauled from 260 into 650 m *Thorogobius rofeni* Miller, 1988, only known from a single specimen from the Gulf of Guinea, is among the deepest records of gobiid fishes.

Four females, 58.0-71.7 mm SL and 2 males, 74.9-77.1 mm SL of *T. rofeni* (CAS 222613) were collected about 50 km offshore of South Angola (17°13'S, 11°22'E) on 27 March 2005. These specimens represent the first record for Angola and the Southeast Atlantic (Fig. 1). Collected between 288 and 294 m by the vessel "Dr. Fridtjof Nansen" the specimens from South Angola are the deepest confirmed records of this rare species.

The standard length of the holotype (ZMUC P781640) is not in accordance with the value given by Miller (1988). Therefore the body proportions of the type are additionally given in table I. Meristic and morphometric methods follow Miller (1988); A, anal fin; C, caudal fin; D1, D2, first and second dorsal fins; P, pectoral fin; V, pelvic disc; LL, TR scales in lateral and transversal series. Terminology of the lateral line system follows Sanzo (1911). Free neuromasts are listed by innervation categories for Gobiidae (Ahnelt and Bohacek, 2004). Institutional abbreviations: CAS, California Academy of Sciences; ZMUC, Zoological Museum of Copenhagen.

Description

Anterior naris short, tubular and without process from rim, P with dorsalmost fin rays within fin membrane, V complete, middle rays of

		ZMUC-P781640	CAS 222316	
	Sex	f	m	f
	n	Holotype	2	4
	SL (mm)	81.8	74.9 - 77.1	58.0 - 71.7
%SL,	H	32.7	30.6-31.5 (31.1, 0.6)	31.0-32.8 (32.0, 0.8)
	Hw	15.9	13.1-13.4 (13.3, 0.3)	12.1-13.0 (12.5, 0.4)
	SN/D1	38.2	34.8-35.9 (35.3, 0.7)	36.1-38.5 (36.9, 1.1)
	SN/D2	56.8	48.1-54.7 (51.4, 4.6)	55.7-58.5 (56.5, 1.3)
	SN/AN	55.4	55.3-57.4 (56.4, 1.5)	56.3-59.7 (57.5, 1.5)
	SN/A	61.0	61.4-63.6 (62.5, 1.5)	62.1-66.1 (63.9, 1.7)
	SN/V	32.6	32.1-32.6 (32.3, 0.4)	32.3-34.1 (33.0, 0.8)
	CP	24.5	26.1-26.5 (26.3, 0.3)	21.1-26.4 (24.4, 2.4)
	D1b	12.0	12.0-12.8 (12.4, 0.5)	12.0-14.7 (13.0, 1.2)
	D2b	22.5	24.2-24-4 (24.3, 0.1)	23.2-25.2 (23.9, 1.0)
	D1/D2	7.4	6.1-7.4 (6.7, 0.9)	7.0-8.2 (7.4, 0.5)
	Ab	13.4	14.7-15.5 (15.1, 0.6)	14.4-17.4 (15.5, 1.3)
	Cl	d	26.4 (26.4)	27.8-32.0 (29.4, 2.3)
	Pl	21.8	21.5-25.6 (23.5, 2.9)	23.7-25.6 (24.8, 0.8)
	Vl	d	22.3-22.8 (22.6, 0.3)	23.2-25.9 (24.6, 1.4)
	Vd	18.1	16.0-16.6 (16.3, 0.4)	14.6-18.7 (16.9, 1.7)
	Ad	17.2	16.1 (16.1, 0.0)	15.4-16.9 (15.9, 0.7)
	Aw	9.5	8.2-8.8 (8.5, 0.4)	8.1-9.7 (8.9, 0.7)
	CPd	9.6	9.5-9.8 (9.7, 0.2)	9.1-9.8 (9.4, 0.3)
	V/AN	24.1	24.4-26.4 (25.4, 1.5)	24.4-26.5 (25.6, 1.0)
%CP,	CPd	39.2	36.3-37.0 (36.7, 0.5)	37.1-45.4 (39.3, 4.1)
%H,	SN	25.9	21.8-24.0 (22.9, 1.5)	21.8-23.3 (22.6, 0.6)
	E	33.1	27.6-28.7 (28.1, 0.8)	27.7-30.2 (29.4, 1.2)
	PO	43.2	48.5-50.1 (49.3, 1.2)	46.8-49.3 (47.9, 1.2)
	CHd	20.8	16.8-18.8 (17.8, 1.4)	14.7-16.6 (15.6, 1.0)
	Hw	48.6	37.9-42.6 (40.3, 3.3)	36.9-40.1 (38.9, 1.4)
%E,	I	8.6	10.9-11.5 (11.2, 0.4)	8.8-12.1 (10.6, 1.5)
%V/AN,	Vl	d	84.4-93.6 (89.0, 6.5)	89.0-100.5 (95.9, 5.1)

Table I. - Body proportions of *Thorogobius rofeni*. Abbreviations: Ab, length of anal fin base; Ad and Aw, body depth and width at anal fin origin; Cl, caudal fin length; CHd, cheek depth from lower border of eye to level of angel of jaws; CP and CPd, caudal peduncle length and depth; d, damaged; D1/D2, interdorsal space, from origin of the last spinous ray of D1 to the origin of D2; D1b and D2b, length of first and second dorsal fin bases; E, eye diameter; H and Hw, head length and width; I, interorbital width; Pl, pectoral fin length; PO, postorbital length; SL, standard length; SN, snout length; SN/A and SN/AN, distance from snout to vertical of anal fin origin and anus; SN/D1 and SN/D2, distance from snout to origin of first and second dorsal fins; SN/V, distance from snout to vertical of pelvic spinous ray (V I) origin; V/AN, distance from origin of V I to anus; Vd, body depth at origin of V I; Vl, pelvic fin length. *[Mesures de* T. rofeni. *Abréviations : Ab, base de la nageoire anale ; Ad et Aw, hauteur et largeur du corps à l'origine de la nageoire anale ; Cl, longueur de la nageoire caudale ; CHd, distance entre le bord inférieur de l'œil et le niveau du bord supérieur des mâchoires ; CP et CPd, hauteur et longueur du pédoncule caudal ; d, endommagé ; D1/D2, espace interdorsal, de l'origine de la dernière épine de D1 à l'origine de D2 ; D1b et D2b, base de la première et de la seconde nageoire dorsale ; E, diamètre de l'œil ; H et Hw, longueur et largeur de la tête ; I, distance interorbitale ; Pl, longueur de la nageoire pectorale ; PO, longueur postorbitale ; SL, longueur standard ; SN, longueur du museau ; SN/A et SN/AN, distance entre le museau et la verticale de l'origine de la nageoire anale et de l'anus ; SN/D1 et SN/D2, distance entre le museau et l'origine de la première et seconde nageoires dorsales ; SN/V, distance entre le museau et la verticale de l'origine de la nageoire pelvienne ; V/AN, distance entre l'origine de VI et l'anus ; Vd, hauteur du corps à l'origine de VI ; Vd, hauteur du corps à l'origine de la nageoire pelvienne ; Vl, longueur de la nageoire pelvienne.]*

---

(1) Department of Theoretical Biology, Faculty of Life Sciences, University of Vienna, Althanstrasse 14, 1090 Vienna, AUSTRIA.
[harald.ahnelt@univie.ac.at]

D1 longest, branchiostegal membrane attached to side of isthmus; body proportions are given in table I. Fins: D1 VI, D2 I/11, A I/9-10 (9: 5, 10: 1), P 19-20 (19: 5, 20: 1), V I/5+5/I, C 17-18 (17: 5, 18: 1). Rays of D1 not distinctly elongate; middle rays of D1 (D1 IV, D1 V) are the longest and reach, when depressed, to D2 2. Rear tips of D2 and A not reaching the dorsal and ventral origins of C respectively. V with fifth fin-ray longer than fourth fin-ray; anterior membrane well developed and about half of spine length. Scales: nearly all scales are abraded. Only a few ctenoid scales remain ventral to the pectoral fin of the holotype with ctenii distinctly shorter than in the two temperate species, but of similar length as in *T. angolensis*. Following counts are based on the scale pockets: LL 28-29 (28: 2, 29: 1), TR 8 (8: 4). The breast, except anteriorly, is scaled, 6-7 (6: 2, 7: 2) cycloid scales along ventral midline. Base of P is scaled ventrally with 2-3 cycloid scales. Dorsal part of pectoral-fin base, head, nape and predorsal area to fifth ray of first dorsal fin naked. Head with anterior and posterior oculoscapular canals, with pores σ, λ, κ, ω, α, β, ρ, ρ1 and ρ2 and with preopercular canal, with pores γ, δ and ε. Rows and, in parentheses, mean of free neuromasts: Innervation by anterior lateral line: supraorbital trunk: *o* (6.2), separated from fellow in dorsal midline; *n* (6.7), *s1* (4.9), *s2* (7.1). Infraorbital trunk: *r1* (6.4), *r2* (6.5), *s3* (4.5), c^2 (14.0) in 2 rows, c^1 (6.9), c_2 (8.2), c_1 (5.5); 7 transverse suborbital rows, 4 before row *b*, rows *5* and *6* divided in upper (*5s*, *6s*) and lower (*5i*, *6i*) sections by row *b*; *1* (17.4), *2* (14.2), *3* (15.8), *4* (17.6), *5s* (6.4), *5i* (9.7), *6s* (10.4), *6i* (21.5) reaching close to *e*, 7 as single neuromast near pore α. Hyomandibular trunk: *b* (18.4), *d* (36.6), *e* (71), *i* (20), *f* (14), *z* (9.8), *ot* (25.5), *os* and *oi* damaged. Innervation by posterior lateral-line nerve: supratemporal ramus: *g* (12.4) reaching row *o*, *m* (6), *x1* (17.3) passing anteriorly pore β, *x2* (6.4), *u* (2.1) and *q* (4.7). Posterior lateral ramus: *h* (13.5), *y* (1.2), *as1* (11), *as2* and *as3* damaged; *la1* (5.3) and *la2* (damaged). Preserved specimens are brown with dark coarse reticulation. Head darker than trunk; rows of neuromasts dark pigmented; lips dark; indistinct dark vertical bar from eye to corner of mouth; dark vertical bar on bases of pectoral-fin rays; fins with dark bands.

Thorogobius rofeni (Fig. 2) differs from the other three species of the genus (values given in parentheses) as follows: (1) pores of the head canals are large, e.g. β equals in diameter the canal distance to α (pores are smaller), (2) neuromast row *g* does not pass row *o* (*g* passes *o* distinctly) and (3) lower count of anal-fin rays (mode) A I/9 (A I/10). Additionally *T. rofeni* differs from the other West African species *T. angolensis* (Norman, 1935) (values in parentheses) by (1) predorsal scales absent (present), (2) breast partly scaled (completely scaled), (3) lobe of pectoral fin with a few scales ventrally (completely scaled) and (4) rays of D1 not elongated (distinctly elongated in both sexes) and from both temperate eastern Atlantic and Mediterranean species *T. ephippiatus* (Lowe, 1839) and *T. macrolepis* (Kolombatovic, 1891) (values in parentheses) by (1) 27-29 scales in lateral series (36-38, 33-42), (2) breast partly scaled (breast naked), (3) lobe of pectoral fin with a few scales (lobe of pectoral fin naked) and (4) scales with very short ctenii.

DISCUSSION

The values of the holotype of *T. rofeni* fit in the range of most values of the specimens from Angola but differ in following characters: (1) in the number of the pectoral and second dorsal-fin rays which are lower in the P (19 *vs* 20) and higher in the D2 (11 *vs* 10); seemingly the values of D2 are not a distinguishing feature; (2) in standard length: the head width is wider and the length of the second dorsal and the anal fin bases are shorter and (3) in head length: the snout length is longer, the eye diameter is larger, the postorbital distance is shorter, the cheek depth and the head width are wider. Interestingly, several values of the holotype, a female, are closer to the values of the two males than to those of the females from Angola. For instance, distance from snout to anal-fin origin and to anus, pectoral-fin length, postorbital distance and cheek depth. The sampling site from Angola and the type locality are about 2000 km apart. Possibly the above mentioned differences in body proportions between the holotype and the specimens from Angola are differences between two distant populations. Nevertheless, to date only seven specimens of this rare species are known and more research is needed.

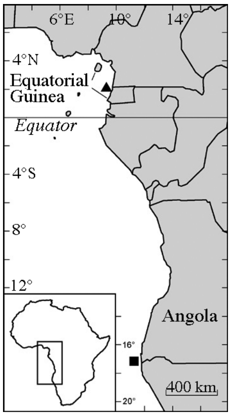

Figure 1. - Map of West Africa, showing sites of previous (triangle) and new records (square) of *Thorogobius rofeni*. *[Carte d'Afrique de l'Ouest indiquant le signalement précédent (triangle) ainsi que les nouveaux (carré) de* T. rofeni.*]*

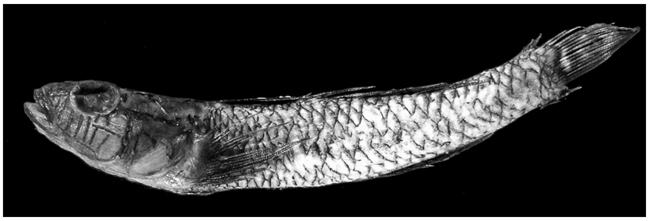

Figure 2. - *Thorogobius rofeni*. Lateral view. CAS 222316, male, 77.1 mm SL; Angola. *[Vue latérale de* T. rofeni.*]*

Acknowledgements. - We are indebted to D. Catania and T. Iwamoto (CAS), and to M. Tammes and P.R. Moller (ZMUC) for the loan of material.

REFERENCES

AHNELT H., ABDOLI A., NADERI M. & B.W. COAD, 2000. - *Anatirostrum profundorum*: A rare deep-water gobiid species from the Caspian Sea. *Cybium*, 24(2): 139-159.

AHNELT H. & V. BOHACEK, 2004. - The lateral line system of two sympatric Eastern Pacific gobiid fishes of the genus *Lythrypnus* (Teleostei: Gobiidae). *Bull. Mar. Sci*., 74: 31-51.

ANDRIYASHEV A.P., 1953. - Ancient deep-water and secondary deep-water fishes and their importance in a zoogeographical analysis. *In*: Notes on Special Problems in Ichthyology, pp. 58-64. Moscow, Leningrad: Izdanie Akademii Nauk SSSR. (In Russian)

MILLER P.J., 1988. - New species of *Corcyrogobius*, *Thorogobius* and *Wheelerigobius* from West Africa (Teleostei: Gobiidae). *J. Nat. Hist., Lond*., 22: 1245-1262.

SANZO L., 1911. - Distribuzione delle papille cutanee (organi ciatiformi) e suo valore sistematico nei Gobi. *Mitt. Zool. Stn. Neapel*, 20: 249-328.

Reçu le 21 août 2007.
Accepté pour publication le 27 novembre 2007.